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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/633,257	07/31/2003	William B. Boyle	K35A1307	4789

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EXAMINER

KO, DANIEL BOKMIN

ART UNIT PAPER NUMBER

2189

DATE MAILED: 11/03/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/633,257	Applicant(s) BOYLE, WILLIAM B.	
	Examiner Daniel B. Ko	Art Unit 2189	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 31 July 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☒ Claim(s) 18 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 31 July 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date: _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date: _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

This action is responsive to the application filed on 7/31/2003. Claims 1-20 have been submitted for examination.

Claim Objections

Claim 18 objected to because of the following informalities: spelling error. On application page 13, lines 12, b) 'because' seems error. Appropriate correction is required.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

1. *Claims 1-3, 10-12, 14, and 17 are rejected under 35 U.S.C. 102(e) as being anticipated by Schulz (US Patent Application 2004/0148470 A1).*

Schulz teaches as claimed including a memory controller configured to perform pre-fetch operations including dynamic pre-fetch control (See abstract).

Regarding claims 1 and 17, Schulz teaches a disk drive control system comprising:

- a micro-controller (Fig. 1, element 20A; page 1, paragraph 16);
- a micro-controller cache system adapted to store micro-controller data for access by the micro-controller (Fig. 3, element 35, cache subsystem; page 2, paragraph 22);
- a buffer manager adapted to provide the micro-controller cache system with micro-controller requested data stored in a remote memory (Fig. 2, element 121, buffer; page 2, paragraph 28); and
- a cache demand circuit adapted to:
 - a) receive a memory address and a memory access signal (page 2, paragraph 19), and
 - b) cause the micro-controller cache system to fetch data from the remote memory via the buffer manager based on the received memory address and memory access signal prior to a micro-controller request (page 4, paragraph 40; page 6, paragraph 58).

Regarding claim 2, Schulz teaches a disk drive control system, wherein the memory address and a memory access signal are received from the micro-controller

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and wherein the memory address is an address of data residing in the remote memory (page 2, paragraph 19).

Regarding claim 3, Schulz teaches a disk drive control system, wherein the memory access signal is a write signal received from the micro-controller (page 3, paragraph 30).

Regarding claim 10, Schulz teaches a disk drive control system, wherein the micro-controller cache system comprises a cache memory having a plurality of cache segments wherein the fetched data is stored in a cache segment of the memory (Fig. 2, element 110, cache memory; page 2, paragraph 25).

Regarding claim 11, Schulz teaches a disk drive control system, wherein the micro-controller cache system is adapted to receive the memory address and the memory access signal from the cache demand circuit (page 2, paragraph 19; page 43, paragraph 43).

Regarding claim 12, Schulz teaches a disk drive control system, wherein the buffer manager is in communication with a plurality of control system clients and provides client-requested data to the clients from the remote memory (Fig. 2, element 121, buffer; page 3, paragraph 28).

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Regarding claim 14, Schulz teaches a disk drive control system, wherein the remote memory comprises a dynamic random access memory (DRAM) (page 2, paragraph 20).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

2. *Claims 4-9, 13, 15-16, 18 and 19-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schulz (US Patent Application 2004/0148470 A1) and Hoskins (US Patent 6,789,132 B2).*

Regarding claim 18, Schulz teaches a disk drive control system comprising:
a micro-controller (Fig. 1, element 20A; page 1, paragraph 16);

a micro-controller cache system adapted to store micro-controller data for access by the micro-controller (Fig. 3, element 35, cache subsystem; page 2, paragraph 22);

a buffer manager adapted to provide the micro-controller cache system with micro-controller requested data stored in a remote memory (Fig. 2, element 121, buffer; page 2, paragraph 28);

a cache demand circuit adapted to:

a) receive a predetermined memory address from the micro-controller and the transmitted interrupt signal from the interrupt circuit (page 2, paragraph 19), and

b) cause the micro-controller cache system to fetch data from the remote memory via the buffer manager prior to a micro-controller request (page 4, paragraph 40; page 6, paragraph 58).

Schulz fails to teach an interrupt circuit adapted to interrupt the micro-controller based on a transmitted interrupt signal.

Hoskins teaches a data storage control module for controlling operational processes comprising preemptive, non-preemptive, and scheduler modules (See abstract). Hoskins teaches an interrupt circuit adapted to interrupt the micro-controller based on a transmitted interrupt signal (See, Fig. 2, element 230, host interrupt module; column 10, lines 56-67)

At the time of invention it would have been obvious to a person of ordinary skill in the art to combine the Schulz with Hoskins. The motivation for doing so would have been a proper handle of time critical operation. Hoskins states that the preemptive control modules handle time critical operation, such as responses to interrupts from a host computer (column 3, lines 5-7). Therefore, it would have been obvious to implement Schulz's pre-fetch with Hoskins' interrupt to minimize delays.

Regarding claims 4 and 8, Hoskins teaches a disk drive control system, wherein the memory access signal is a priority interrupt signal (Fig. 2, element 230, host interrupt module; column 10, lines 56-67). Hoskins teaches a preemptive multi-tasking which means there is a priority.

Regarding claims 5-7, 9, and 19-20, Schulz teaches pre-fetching of cache system (page 4, paragraph 40) and it is obvious that memory address needs to be predetermined in order to pre-fetch.

Regarding claim 13, Hoskins teaches a disk drive control system, wherein the plurality of control system clients comprises at least one of a disk subsystem, an error correction code subsystem, and a host interface subsystem (column 30, lines 59-66).

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Regarding claim 15, Hoskins teaches a disk drive control system, wherein the memory access signal is a servo-interrupt signal (column 10, lines 56-67).

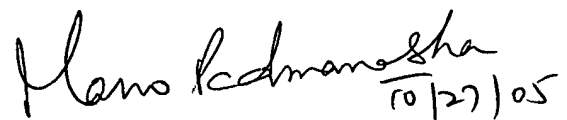
Regarding claim 16, Hoskins teaches a disk drive control system, wherein the memory access signal is a host-interrupt signal (Fig. 2, element 230, host interrupt module; column 10, lines 56-67).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Daniel B. Ko whose telephone number is 571-272-8194.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Manorama Padmanabhan can be reached on 571-272-4210. The fax phone number for the organization where this application or proceeding is assigned is 703-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Handwritten signature of Mano Padmanabhan in cursive script, with the date 10/27/05 written below it.

MANO PADMANABHAN
SUPERVISORY PATENT EXAMINER

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Daniel Ko

Daniel B. Ko
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